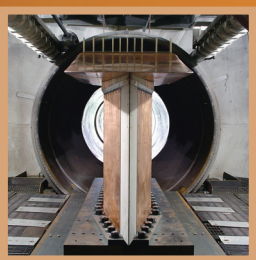


Langley Research Center's

8-Foot High-Temperature Tunnel

The 8-Foot High-Temperature Tunnel (HTT) is the nation's largest hypersonic blowdown test facility. The facility supports large scale thermal protection system testing, flight qualification testing, and hypersonic engine testing. The HTT duplicates as near as possible, the flight conditions that would be encountered by hypersonic vehicles in the atmosphere. The facility test stream is produced by burning methane, air, and liquid oxygen and expanding the combustion products through any one of several nozzles into the test section. The facility currently provides testing capability at Mach 4, Mach 5, and Mach 6.5, and construction is in progress to provide Mach 3 test capability.

The test section accommodates very large (5 by 9 ft) thermal protection system models. The facility has been heavily utilized for hypersonic engine testing and has tested the National Aerospace Plane Concept Demonstration Engine, the X-43 Hyper-X engine, the Office of Naval Research HyFly Dual Combustor Ramjet Engine, the X-43C program's Ground Demonstrator Engine No. 2, and the Air Force Research Laboratory SJX61-1 and SJX61-2 engines. The facility has an array of test support systems that include hydrogen system, silane system, JP-7 system, JP-10 system, ethylene system, model hydraulic system, water cooling systems, and nitrogen purge systems.



Facility Benefits

- Proven experienced hypersonic test team
- Close working relationship with NASA's Hypersonic Airbreathing Propulsion Branch
- Nozzle calibration data available at all test Mach numbers
- Numerous test support systems available to meet varied test requirements
- All test data supplied to customers on a CD or DVD in customer selectable format
- Unlimited optical access for photography and video systems

Characteristics

Nozzle exit dimension	96 in. (2.4 m)
Speed	Mach 5, 6, or 7
Test section	8 ft x 12 ft (2.4 m x 3.7 m)
Altitude range	50 000 - 120 000 ft (15. km - 36.6 km)
Reynolds number	0.44 to 5.09×10^6 per ft (Mach dependent)
Plenum Stagnation Temperature	900 to 3500 °F (Mach dependent) (480 to 1950 °C) (Mach dependent)
Plenum Stagnation Pressure with oxygen enrichment	50 to 2000 psia (340 kPa to 13.8 MPa)
Plenum Stagnation Pressure with no oxygen enrichment	50 to 4000 psia (340 kPa to 27.5 MPa) (for thermal protection system testing)

Instrumentation

Strain gauge balances	Six-component force and moment measurement system
Available corrections	Interactions, temperature effects, attitude tares, axes orientation, pressure tares, and momentum (flow) tares
Electronically scanned pressure (ESP) system	512 channels
Thermocouples	288 available channels at 50 samples per sec
Strain gauge based devices	144 available channels at 50 samples per sec
Electronically scanned pressure (ESP) system	1000 channels at 10 samples per sec

Facility Applications

- Tested the National Aerospace Plane Concept Demonstration Engine, X-43 Hyper-X Engine, Office of Naval Research HyFly Dual Combustor Ramjet Engine, X-43C program's Ground Demonstrator Engine No. 2, and Air Force Research Laboratory SJX61-1 and SJX61-2 engines
- U.S. Missile Defense Agency/Japanese Defense Agency missile nosecone flight qualification test
- NASA Next Generation Launch Transportation (NGLT) program metallic thermal protection system test
- NASA program for the Advancement of Inflatable Decelerators for Atmospheric Entry thermal protection system test

Data Acquisition and Processing

Low frequency system	512 channels at 50 samples per sec
High frequency system	96 channels at up to 200 K samples per sec
Classified capability	Yes

Contact Information

<http://www.aeronautics.nasa.gov/atp/index.html>

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